

**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE
OF ENGINEERING & RESEARCH, SANGOLA
(An Autonomous Institute)**

**Affiliated to Dr. Babasaheb Ambedkar Technological University (BATU),
Lonere**



In line with the
National Education Policy (NEP) 2020 Compliant
Curriculum
For
UNDER-GRADUATE PROGRAMME
First Year B. Tech. (Sem.-I & II)
(w.e.f. A.Y. 2025-26)



FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)

Curriculum for First Year B. Tech. with effect from A.Y. 2025-26

Semester I

Scheme- A (Civil and Mech)

Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme		End Semester Evaluation Scheme		Total Marks
			L	T	P		MSE	ICA	ESE	OE/POE	
							M	M	M	M	
BSC	25UGS11001	Applied Physics	3	-	-	3	30	10	60	-	100
	25UGS11002	Applied Physics Lab	-	-	2	1	-	25	-	-	25
	25UGS11004	Engineering Mathematics-I	3	1	-	4	30	10	60	-	100
ESC	25UME11001	Engineering Graphics & CAD	2	-	-	2	30	10	60	-	100
	25UME11002	Engineering Graphics & CAD Lab	-	-	2	1	-	25	-	-	25
	25UCE11001	Basic Civil Engineering	2	-	-	2	30	10	60	-	100
	25UCE11002	Basic Civil Engineering Lab	-		2	1	-	25	-	25	50
	25UET11001	Basic Electrical & Electronics Engineering	2		-	2	30	10	60	-	100
VSEC	25UGS11101	Workshop	-	-	4	2	-	50	-	-	50
AEC	25UGS11401	Communication Skills	1	-	-	1	-	25	-	-	25
	25UGS11402	Communication Skills Lab	-	-	2	1	-	25	-	-	25
CC	25UGS11301	NSS	-	-	4	2	-	50	-	-	50
		Total	13	1	16	22	150	275	300	25	750

Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks

*Students must complete a student induction program at the start of the first semester to ease their transition into the academic environment.



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Semester II

Scheme- A (Civil and Mech)

Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme		End Semester Evaluation Scheme		Total Marks
			L	T	P		MSE	ICA	ESE	OE/POE	
							M	M	M	M	
BSC	25UGS12005	Applied Chemistry	2	-	-	2	30	10	60	-	100
	25UGS12006	Applied Chemistry Lab	-	-	2	1	-	25	-	-	25
	25UGS12007	Engineering Mathematics-II	3	1	-	4	30	10	60	-	100
ESC	25UCE12003	Applied Mechanics	3	-	-	3	30	10	60	-	100
	25UCE12004	Applied Mechanics Lab	-	-	2	1	-	25	-	-	25
	25UME12005	Basic Mechanical Engineering	2		-	2	30	10	60	-	100
	25UME12006	Basic Mechanical Engineering Lab	-		2	1	-	25	-	25	50
PCC	25UME11129	Programming Techniques and Applications	1	-	-	1	-	25	-	-	25
	25UME11130	Programming Techniques and Applications Lab	-	-	2	1	-	25	-	50	75
VSEC	25UGS11102	Computer Tools and Applications Lab	-	-	4	2	-	50	-	-	50
IKS	25UGS11201	IKS- Vedic Mathematics	2	-	-	2	-	50	-	-	50
CC	25UGS11302	Yoga/ Sports	-	-	4	2	-	50	-	-	50
		Total	13	1	16	22	120	315	240	75	750
			Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks								

□ **Instructions:**

- Students of respective branches will undergo for Scheme A (For Civil &Mech), Scheme B (for AIDS & CSE) and Scheme C (for Electrical & E&TC)

➤ **Guidelines for the Student Induction Program:**

- New entrants in an engineering program come with different backgrounds, perspectives, and experiences- social, economic, regional, and cultural. It is essential to help them transition smoothly into this new environment and instill in them the institution's ethics, along with a broader sense of purpose.
- To facilitate this transition, an **Induction Program** for newly admitted undergraduate students will be conducted at the beginning of the first semester.
- The Induction Program aims to:
 - Help students acclimate to their new surroundings.
 - Foster openness and interpersonal connections.
 - Establish a healthy daily routine.
 - Build peer-to-peer and faculty-student relationships.
 - Enhance self-awareness and sensitivity toward others, society, and nature.
- The program includes the following activities that promote personal growth, social awareness, and academic readiness and to help them integrate into their new environment
 - Physical activities for well-being.
 - Creative arts for expression.
 - Literary activities for intellectual development.
 - Universal human values to encourage ethical awareness and social responsibility
 - Proficiency modules to strengthen foundational academic skills.
 - Lectures by experts and eminent persons for valuable insights.
 - Visits to local establishments such as hospitals and social NGOs to connect with the community.
 - Familiarization with the institute and various departments
- While the Induction Program does not carry any marks or credits, student participation will be assessed at the institute level based on the following mandatory criteria:
 - Attendance
 - Active Participation

➤ **Course Nomenclature Format:**

Courses are assigned unique 10-character codes following the structure below:

- **First two numeric characters** – Indicate the academic inception year of curriculum implementation, e.g., 25 for 2025.
- **Next one characters** – Represent the education level, e.g., U- for Undergraduate and P- for Postgraduate
- **Following two characters** – Discipline code, e.g., GS- for General Science Engineering, AI- Artificial Intelligence and Data Science, CE- Civil Engineering, CS- Computer Science and Engineering, EE- Electrical Engineering, ET- Electronics and Telecommunications Engineering, ME- Mechanical Engineering.
- **One numeric character** – Years of study within a degree or program, e.g., 1 for F.Y. B. Tech, 2 for S.Y. B. Tech. 3 for T.Y. B. Tech and 4 for Final Year
- **One numeric character** – Semester numbers range from 1 to 2.
- **Next three numeric characters** – Department-assigned course number, e.g., 001 to 99,9 under different course categories

➤ **Course Type Descriptions:**

Type of Course	Description	Course Code	Responsible Department
BSC	Basic Science Course	001-100	General Science Department (FE)
VSEC	Vocational and Skill Enhancement Course	101-200	
IKS	Indian Knowledge System	201-300	
CC	Co-curricular Courses	301-400	
AEC	Ability Enhancement Course	401-500	
ESC	Engineering Science Course	001-100	Respective Departments
PCC	Program Core Course	101-200	
PCE	Program Core Elective	201-300	
HON	Honors	301-400	
MDM	Multidisciplinary Minor	401-500	
OE	Open Electives	501-600	

➤ **Courses and Credits offered in Semesters I & II as per NEP-2020:**

Course Type	Course Code	Name of the Course	Credits	Actual Total Credits Utilized in Sem. I & II	Total Credits Range Required as per NEP-2020 in Sem. I & II
BSC	25UGS11001	Applied Physics	3	15	14-18
	25UGS11002	Applied Physics Lab	1		
	25UGS12005	Applied Chemistry	2		
	25UGS12006	Applied Chemistry Lab	1		
	25UGS11004	Engineering Mathematics-I	4		
	25UGS12007	Engineering Mathematics-II	4		
ESC	25UME11001	Engineering Graphics & CAD	2	15	12-16
	25UME11002	Engineering Graphics & CAD Lab	1		
	25UCE11001	Basic Civil Engineering	2		
	25UCE11002	Basic Civil Engineering Lab	1		
	25UET11001	Basic Electrical & Electronics Engineering	2		
	25UCE12003	Applied Mechanics	3		
	25UCE12004	Applied Mechanics Lab	1		
	25UME12005	Basic Mechanical Engineering	2		
	25UME12006	Basic Mechanical Engineering Lab	1		
PCC	25UME11129	Programming Techniques and Applications	1	2	2
	25UME11130	Programming Techniques and Applications Lab	1		
VSEC	25UGS11102	Computer Tools& Applications	2	4	4
	25UGS12103	Scripting Languages Lab	2		
AEC	25UGS11401	Communication Skill	1	2	2
	25UGS11402	Communication Skill Lab	1		
IKS	25UGS11201	IKS-Vedic Mathematics	2	2	2
CC	25UGS11302	Yoga/Sports/Cultural	2	4	4
	25UGS11301	NSS	2		
Total Credits			44	44	40-48

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Applied Physics (25UGS11001)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Apply the concept of acoustics and calculate absorption coefficients and reverberation time.			
CO 2	Describe the production of ultrasonic waves and identify various types of defects in materials.			
CO 3	Use interference, diffraction, and polarisation phenomena to design optical instruments.			
CO 4	Describe the concepts of nuclear physics and Quantum Mechanics.			
CO 5	Explain nanomaterials, their production techniques, and synthesis method.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Acoustics Acoustics: Introduction, Architectural acoustics, Reverberation time, Sabine's formula, Absorption coefficient, Factors affecting on architectural acoustics of buildings, Acoustic planning of buildings (remedies) and numericals.			8
Unit 2	Ultrasonics Ultrasonics: Ultrasonic waves, Production of ultrasonics (Piezoelectric effect, Magnetostriction effect), and its applications and numericals. Non-Destructive Testing (NDT): Types of defects, Method of NDT, Visual Inspection, Liquid/Dye penetrant testing.			8
Unit 3	Wave Optics Interference: Interference in thin film due to reflected light, Wedge-shaped film, Newton's Rings, Polarization of light: Methods for production of polarized light			8

	(Reflection, Refraction & Double refraction), Specific rotation and optical activity, Diffraction of light: Definition and difference between diffraction and interference. Introduction of diffraction grating, Resolving power of diffraction grating.	
Unit 4	Nuclear Physics & Quantum Mechanics Nuclear Physics: Mass Defect, Nuclear reaction, Q values of nuclear reaction, GM Counter, Quantum Mechanics: de Broglie's Concept of matter wave, Heisenberg's uncertainty principle, Schrodinger's time-dependent and time independent wave equations, Introduction to quantum computing (bits & qubits, difference between classical and quantum computers).	8
Unit 5	Nano Technology Nano-materials: Nanomaterial, Production techniques (Top down and bottom up), Carbon, Nano Tubes (CNTs), Ball milling and spray pyrolysis methods for synthesis of nanoparticles.	7
Text Books:		
1)	Engineering Physics - R.K. Gaur and S. L. Gupta. Dhanpat Rai Publications Pvt. Ltd.- New Delhi.	
2)	Fundamental of Physics - Halliday and Resnik. Willey Eastern Limited.	
3)	Applied Physics I: R. J. Gawade, G. M. Kharmate, Dr. A. Chakrabarti, Synergy Knowledge Publication.	
Reference Books:		
1)	Engineering Physics – M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd.	
2)	Nanotechnology: An Introduction To Synthesis, Properties And Applications of Nanomaterials – Thomas Varghese, K. M. Balakrishna	
3)	Optics –Ajoy Ghatak. MacGraw Hill Education (India) Pvt. Ltd	
4)	"Concepts of Modern Physics" by Arthur Beiser	
5)	"Introduction to Quantum Mechanics" by David J. Griffith	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Applied Physics Lab (25UGS11002)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Determine the velocity of ultrasonic waves in liquids and the thickness of a thin wire by using wedge shaped thin film.			
CO 2	Determine the radius of curvature of a plano-convex lens by analyzing the fringe pattern formed by Newton's rings.			
CO 3	Measure the specific rotation of optically active substances using a half-shade polarimeter and understand the principles of optical activity and study the crystal Plane			
CO 4	Calculate the wavelength of a laser source using diffraction principles			
CO 5	Demonstrate the synthesis, characterization, and analysis of nanomaterials			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Determination of velocity of ultrasonic wave in given liquid using ultrasonic interferometer			2
Ex. 2	Measurement of absorption coefficient of given sound absorbing materials			2
Ex. 3	Determination of wavelength of monochromatic light by using Newton's rings			2
Ex. 4	Measurement of radius of curvature of Plano convex lens by using Newton's rings			2
Ex. 5	Determination of wavelength of He-Ne laser using diffraction grating			2
Ex. 6	Determination of the thickness of a thin film by measurement by wedge shaped air film			2
Ex. 7	Determination of the resolving power of a plane diffraction grating using a spectrometer.			2
Ex. 8	Determination of specific rotation of optically active material			2
Ex. 9	Demonstrate the scales of nanotechnology			2

Ex. 10	Demonstration of Geiger-Muller tube	2
Text Books:		
1)	Engineering Physics - R.K. Gaur and S. L. Gupta. Dhanpat Rai Publications Pvt. Ltd.- New Delhi.	
2)	Fundamental of Physics - Halliday and Resnik. Willey Eastern Limited.	
Reference Books:		
1)	Engineering Physics – M.N. Avadhanulu and P.G. Kshirsagar.S.Chand and Company LTD.	
2)	Nanotechnology: An Introduction To Synthesis, Properties And Applications of Nanomaterials – Thomas Varghese, K. M. Balakrishna	
3)	Optics –Ajoy Ghatak. MacGraw Hill Education (India) Pvt. Ltd	
4)	"Concepts of Modern Physics" by Arthur Beiser	
5)	"Introduction to Quantum Mechanics" by David J. Griffith	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Engineering Mathematics-I (25UGS11004)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	1	1	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	4	4	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Illustrate the applications of De Moivre's theorem, and establish relationships between circular and hyperbolic functions.			
CO 2	Demonstrate the concept of partial derivatives and their applications in engineering.			
CO 3	Compute Jacobians, errors, approximations, and maxima and minima of functions using partial derivatives.			
CO 4	Solve first-order differential equations with applications to various engineering problems.			
CO 5	Apply vector differentiation techniques to analyze the physical and geometrical properties of vectors.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Complex Numbers, Review of complex numbers, De Moivre's theorem, applications of De Moivre's theorem : roots of complex numbers, circular functions of a complex variable and hyperbolic functions, relation between circular and hyperbolic functions, separation of real and imaginary parts, logarithm of complex numbers.			8
Unit 2	Partial Differentiation Partial derivatives of first and higher orders, variable to be treated as constant, total derivative, change of variables, partial differentiation of composite functions, Homogeneous functions – Euler's theorem and their deductions for functions containing two variables (without proof), applications to various engineering problems.			7
Unit 3	Applications of Partial Differentiation Jacobians, properties of Jacobian: $JJ'=1$, errors and approximations, maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers with a single			7

	constraint.	
Unit 4	Ordinary Differential Equations and Their Applications Order and degree of ordinary differential equations, ordinary differential equations of first order and first degree: Exact differential equations and Equations reducible to exact differential equations, linear differential equations, reducible to linear differential equations, Applications to orthogonal trajectories, Newton's law of cooling, Electrical and Electronics engineering applications.	9
Unit 5	Vector Differentiation Velocity vector, acceleration vector, tangential and normal component of acceleration, vector differential operator, gradient, directional derivatives, angle between surfaces, divergence and curl, solenoidal and irrotational field.	8
Text Books:		
1)	Higher Engineering Mathematics (42 nd Edition), B. S. Grewal, Khanna Publications, Delhi.	
2)	Advanced Engineering Mathematics, E. Kreyzig’s, John Wiley & Sons, INC.	
Reference Books:		
1)	Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi	
2)	A Text Book of Engineering Mathematics by Peter O’ Neil, Thomson Asia Pte Ltd., Singapore.	
3)	Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw- Hill Publishing Company Ltd., New Delhi.	
4)	Engineering Mathematics, Srimanta Pal and Subodh C. Bhunia, Oxford University Press India.	
5)	Mathematics for Engineering Applications, Kuldip S. Rattan and Naathan W. Klingbeil Wiley.	
6)	Engineering Mathematics Through Applications, Kuldeep Singh, PalgraveMacmilan.	
7)	Advanced Engineering Mathematics, H. K. Dass, S. Chand Publications, Delhi.	
8)	A Textbook of Engineering Mathematics, N. P. Bali and Manish Goyal, Laxmi Publications, 2008	
9)	A Textbook of Applied Mathematics, P. N. and J. N. Wartikar, Vol.1, Pune VidyarthiGrihaPrakashan.	
10)	A Course in Engineering Mathematics (Vol I) by Dr. B. B. Singh, Synergy Knowledgeware, Mumbai.	
Sr. No.	Name of Tutorial / Assignment	
1)	Solve numericals to find roots of algebraic equations.	
2)	Solve numericals to find logarithms of complex numbers.	
3)	Solve numericals on partial differentiation of composite functions.	
4)	Solve numericals on Euler's theorem on homogeneous functions.	
5)	Solve numericals on errors and approximations.	
6)	Solve numericals to find maxima and minima of functions of two variables.	
7)	Solve numericals of reducible exact and reducible to linear differential equations	
8)	Solve numerical problems of orthogonal trajectories and Newton’s law of cooling.	
9)	Solve numerical problems of electrical and electronics engineering applications.	
10)	Solve numericals to find directional derivatives of vectors	
11)	Solve numericals to check whether a given function is irrotational or not, if irrotational then find its scalar potential.	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Engineering Graphics & CAD (25UME11001)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Identify and use engineering drawing instruments, apply BIS standards for lines, dimensions, and prepare 2D drawings using CAD software.			
CO 2	Interpret and draw projections of points and straight lines in various orientations, and determine their true length and inclinations			
CO 3	Construct projections of different types of planes in various positions with respect to reference planes.			
CO 4	Draw projections of regular solids in different orientations with respect to HP and VP.			
CO 5	Apply principles of orthographic and isometric projection to convert between orthographic and isometric views of objects and machine components manually, and use CAD software.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Fundamentals of Engineering Drawing and CAD Drawing instruments and their uses. Drawing sheet layout, title block, borders, and lettering. Types of lines and dimensioning systems (BIS standards), Introduction to engineering curves, Introduction to CAD: user interface and workspace setup. Basic CAD commands: Draw, Modify, Dimension, and Properties.			6
Unit 2	Projection of Points and Lines Projection of points located in various quadrants. Projection of straight lines: Parallel to HP/VP or both. Perpendicular to HP/VP or both. Inclined to one or both planes. True length and inclination of a line.			5
Unit 3	Projection of Planes Types of planes: triangle, square, rectangle, Pentagon, hexagon, circle, etc. Projection of			5

	planes: Parallel to one reference plane and perpendicular to the other. Inclined to one reference plane and perpendicular to the other. Inclined to both HP and VP.	
Unit 4	Projection of Solids Types of solids: Prisms, Pyramids, Cylinders, Cones. Projection of solids with axis: Perpendicular to one reference plane. Inclined to one and parallel to the other. Inclined to both HP and VP.	5
Unit 5	Orthographic and Isometric Projections Principles and methods of orthographic projection. First-angle and third-angle projection systems. Drawing orthographic views of machine elements and solids. Isometric projection principles and construction using an isometric scale. Conversion of orthographic views to isometric and vice versa. Development of 2D and isometric views using CAD. Introduction to basic 3D modeling concepts within 2D CAD tools viz., extrude, revolve, etc.	5

Text Books:

1)	Engineering Drawing and Computer Graphics, M. B. Shah, & B. C. Rana (2008), Pearson Education.
2)	Engineering Graphics, B. Agrawal & C. M. Agrawal (2012), TMH Publication.

Reference Books:

1)	Engineering Drawing & Design, Cecil Jensen, Jay Helsel, Dennis Short, 7 th edition, 2015 TMH Publication.
2)	Engineering Graphics, M. L. Dabhade, Vision Publication.
3)	Engineering Graphics Essentials, Kristie Plantenberg, SDC Publication.
4)	Engineering Drawing, K. L. Narayana, & P Kannaiah, Scitech Publication.
5)	Engineering graphics with Auto CAD- R.B. Choudary, Anuradha Publishes.
6)	Engineering Graphics & Design, A. P. Gautam& Pradeep Jain, Khanna Publishing House.
7)	Engineering Drawing, N. D. Bhatt, Charotar Publishing House Pvt.Ltd..

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Engineering Graphics & CAD Lab (25UME11002)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Identify and use engineering drawing instruments, apply BIS standards for lines, dimensions, and set up a CAD workspace for 2D drafting.			
CO 2	Interpret and draw projections of points and lines in different orientations and determine their true length and inclinations.			
CO 3	Construct projections of various types of planes in multiple positions with respect to reference planes.			
CO 4	Draw accurate projections of regular solids in different orientations with respect to HP and VP			
CO 5	Apply principles of orthographic and isometric projection to convert between views of objects and machine components, and prepare CAD mini-project drawings with proper plotting.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Introduction to Engineering Drawing & CAD Interface			6
Ex. 2	Projection of Points and Lines			4
Ex. 3	Projection of Planes			4
Ex. 4	Projection of Solids			4
Ex. 5	Orthographic and Isometric Projection			4
Ex. 6	CAD Mini Project – Drawing & Plotting			4
Text Books:				
1)	Engineering Drawing and Computer Graphics, M. B. Shah, & B. C. Rana (2008), Pearson Education.			

2)	Engineering Graphics, B. Agrawal & C. M. Agrawal (2012), TMH Publication.
Reference Books:	
1)	Engineering Drawing & Design, Cecil Jensen, Jay Helsel, Dennis Short, 7 th edition, 2015 TMH Publication.
2)	Engineering Graphics, M. L. Dabhade, Vision Publication.
3)	Engineering Graphics Essentials, Kristie Plantenberg, SDC Publication.
4)	Engineering Drawing, K. L. Narayana, & P Kannaiah, Scitech Publication.
5)	Engineering graphics with Auto CAD- R.B. Choudary, Anuradha Publishes.
6)	Engineering Graphics & Design, A. P. Gautam& Pradeep Jain, Khanna Publishing House.
7)	Engineering Drawing, N. D. Bhatt, Charotar Publishing House Pvt.Ltd..

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Basic Civil Engineering (25UCE11001)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 Marks
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Determine the fundamental properties of building material.			
CO 2	Apply fundamental concepts of building components and green building principles in the planning and construction of sustainable structures.			
CO 3	Demonstrate the use of basic surveying, leveling, and geospatial technologies in data collection and mapping tasks.			
CO 4	Illustrate basic principles of transportation engineering to analyze the road components and traffic-related elements in road design.			
CO 5	Examine the principles of water resource management through the identification of water sources, dam and canal types, and irrigation methods.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Introduction to Civil Engineering Definition and various sub-domains of civil engineering. Relevance of the Civil Engineering branch with other branches, Role of the civil engineer in various construction activities, Building Materials & their Properties:- Earth, Bricks, Timber, Stone, Sand, Aggregate, Cement, Mortar, Concrete, Steel, Bitumen.			5
Unit 2	Components of Buildings and Green Building General Idea, Components of Substructure, Foundation, Types of Foundation, Function of Foundation, Superstructure: principle of load transfer, frame action. General idea about substructure, superstructure, and their various elements and their functions, Green Building: concept of planning and construction of green building, sustainable development, Rainwater Harvesting.			6

Unit 3	Surveying Definition, general principles of surveying, classification of surveying, Measurement of Distance and Angle, Introduction to leveling, Types of Leveling, Application of Leveling, Introduction to Geographic Information System (GIS), Global Positioning System (GPS), Remote sensing with applications.	5
Unit 4	Transportation Engineering Introduction, Modes of Transportation, Road Development Plan, Elements of Road Structure, Classification of Roads, Road Drainage, Properties of sub-grade and pavement component materials, Soil Subgrade, Aggregates and bituminous materials, Traffic Study.	5
Unit 5	Water Management Introduction, Sources of Water, Surface Sources of Water, Underground Sources of Water, Introduction to Dams, Selection of Dams Sites, Types of Dams and Selection of Type of Dams, Canals and Types of Canal, Introduction to Irrigation, Types of Irrigation System, Methods of Irrigation.	5
Text Books:		
1)	Elements of Civil Engineering, S.S.Bhavikatti, New Age International Publishers	
2)	Basics of Remote Sensing & GIS, S. Kumar, University Sc. Press	
Reference Books:		
1)	Building Construction and Drawing, Bindraand Arora, Dhanpat Rai Publications	
2)	Essentials of Civil Engineering, Rangwala, S.C.,Charotar Publishing House	
3)	Building Construction, Volumes 1 to 4, Mckay W.B. and Mckay J.K., Pearson India	
4)	Basic Civil Engineering, L. G. Gole, Mahalaxmi Publications	
5)	Elements of Civil Engineering, Kandya A. A, Charotar Publishing house	

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Basic Civil Engineering Lab (25UCE11002)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 Marks
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Perform standard laboratory tests to determine the properties of common construction materials such as sand, cement, and aggregates.			
CO 2	Execute basic field surveying and levelling operations to measure distances, elevations, and prepare plots or building layouts.			
CO 3	Interpret and apply municipal building bye-laws, road cross-section drawings, and traffic control symbols used in civil engineering projects.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Determine the Specific Gravity of Sand.			2
Ex. 2	Determine the fineness of cement by sieving.			2
Ex. 3	Collection of rules and regulations (Building Bye-laws) of any one municipal council/corporation and its study.			2
Ex. 4	To measure the distance between stations by 20m & 30 m Chain & taking the sample offset.			2
Ex. 5	Plotting Outline of Building by Chaining, Ranging and Offsetting.			2
Ex. 6	Calculate simple leveling and differential leveling.			2
Ex. 7	Draw the Sketches showing Standard Cross Sections of NH/SH/MDR/ODR in Embankment or Cutting.			2
Ex. 8	Draw and Identify the Traffic Signs, Road Marking.			2
Ex. 9	Determine the crushing strength test of aggregate.			
Ex. 10	Determine the impact test of the aggregate.			
Ex. 11	Determine the Elongation Index of the aggregate.			

Ex.12	Determine the Flakiness of the aggregate.	2
Ex.13	Determine the PH value of different samples of water	2
Ex.14	Site visit for various building components.	2
Ex.15	Site Visit of the Dam site.	2
Text Books:		
3)	Elements of Civil Engineering, S.S.Bhavikatti, New Age International Publishers.	
4)	Basics of Remote Sensing & GIS, S. Kumar, University Sc. Press.	
Reference Books:		
6)	Building Construction and Drawing, Bindra and Arora, Dhanpat Rai Publications.	
7)	Essentials of Civil Engineering, Rangwala, S.C., Charotar Publishing House.	
8)	Building Construction, Volumes 1 to 4, McKay W.B. and McKay J.K., Pearson India.	
9)	Basic Civil Engineering, L. G. Gole, Mahalaxmi Publications.	
10)	Elements of Civil Engineering, Kandya A. A, Charotar Publishing House.	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Basic Electrical & Electronics Engineering (25UET11001)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	30
Tutorials:	-	-	ICA:	10
Practical:	-	-	ESE:	60
Total:	2	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Apply the fundamental laws and theorems of electrical circuits to analyze simple DC and AC circuits.			
CO 2	Interpret the construction and working of different electrical systems.			
CO 3	Describe the fundamentals of magnetic circuits and single-phase transformers.			
CO 4	Explain the working principles and applications of semiconductor diodes.			
CO 5	Use types of transistors in electronics circuits.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Basics of Electrical Circuits: DC circuits: Electrical elements: Resistor, Inductor, Capacitor, conductor, Ohm's Law, Kirchhoff's Laws (Simple Problems), Star-delta transformation, AC circuits: AC fundamentals: waveforms, RMS value, average values, form factor, peak factor, steady state analysis of R-L-C series A.C. circuits, active, reactive, apparent power, power triangle and power factor, Simple examples.			6
Unit 2	Electrical Machines: Difference between Generator & motors, DC Generators: Working principle, types, DC Motors: Working principle, types, characteristics, Back emf and Torque Equation, Introduction of Induction Machines, Construction and working principle of three-phase induction motor.			5
Unit 3	Electromagnetism and Single-Phase Transformer			5

	Basic definitions related to magnetic circuits, Faraday's law of electromagnetic induction and Lenz's law, working principle and construction of a single-phase transformer, EMF equation of a single-phase Transformer.	
Unit 4	Diode & Applications: P-N junction diode: Construction, Symbol, working principle, V-I characteristics, Zener diode: Zener diode as voltage regulator, Rectifier-Half wave, Full wave (bridge rectifier and center tapped), circuit operation, Comparison.	5
Unit 5	Transistors Transistors: BJT-PNP, NPN, Transistor configurations: CB, CE, CC, Introduction to FET, MOSFET, CMOS.	5
Text Books:		
1)	Kothari DP and I.J Nagrath, Basic Electrical and Electronics Engineering, Second Edition, McGraw-Hill Education, 2020	
2)	Boylstad, Electronics Devices and Circuits Theory, Pearson Education	
Reference Books:		
1)	Millman Halkias: Electronic Devices and Circuits, McGraw-Hill Publication, 2000.	
2)	Donald Neaman, Electronic Circuit Analysis and Design, McGraw-Hill Publication, 3rd Edition	
3)	B. L. Theraja, Electrical Technology – Volume I, S. Chand.	
4)	V. N. Mittal and Arvind Mittal, Basic Electrical Engineering, McGraw-Hill Publication.	
5)	D C Kulshreshtha, —Basic Electrical Engineering, Tata McGraw Hill, 2010	
6)	B. L. Theraja, Fundamentals of Electrical Engineering and Electronics, S. Chand, 2006	
7)	B. L. Theraja, Electrical Technology – Volume - IV, S. Chand.	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Workshop (25UGS11101)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	4	2	ESE:	-
Total:	4	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Acquire knowledge of instruments, machines, and safety precautions.			
CO 2	Perform basic carpentry operations to make wooden components			
CO 3	Apply different metal forming techniques to shape and form a simple sheet metal job.			
CO 4	Execute precision fitting operations using various fitting tools and develop skills in plumbing assembly to create basic piping structures.			
CO 5	Understand different machining operations and welding processes.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Study of various instruments, machines, and safety measures used in the workshop practices.			2
Ex. 2	Making a Carpentry job involving operations such as marking, cutting, sawing, filing, grooving, to make a half lap joint, butt joint, box, miter, mortise & tenon joint, or any other wood article using a suitable wood material. [one job per student]			2
Ex. 3	One job on shaping and forming by using the smithy forging process. [one job per student]			2
Ex. 4	Study of various tools & fitting operations to complete a small product in a fitting shop.			2
Ex. 5	Making a fitting job involving operations such as cutting, sawing, filing, drilling, and tapping using a mild steel (M.S.) plate. [one job per student]			2
Ex. 6	Making a basic plumbing joint assembly using PVC pipe standard fittings like elbow, tee, cross, adapter, etc. [one job per student]			2
Ex. 7	Study of various tools & sheet metal operations.			2

Ex. 8	Making a sheet metal job like tray, box, funnel, pan, or any other sheet metal articles using G.I. sheet, including development, marking, cutting, bending, riveting, soldering/brazing, spot welding, etc.	2
Ex. 9	Study of the gas welding process.	2
Ex. 10	Making a welded joint using a welding machine (Electric Arc welding, TIG, MIG welding, etc.) [one job per student]	2
Ex. 11	Exercise in the soldering process by using a soldering gun for electrical & electronics components. [one job per student]	2
Ex. 12	Demonstration of Lathe operations like plain turning, step turning, taper, turning, threading, grooving, boring, knurling, etc., using a centre lathe machine.	2
Ex. 13	Demonstration of Assembly and Disassembly of I.C. Engines (Two/Four stroke Engines)	2
Text Books:		
1)	Elements of Workshop Technology, Vol – I by Hajara Chaudhari, Media Promoters.	
2)	Workshop Technology Vol-I by Raghuvanchi B. S, Dhanpat Rai & Sons	
Reference Books:		
1)	Workshop Technology, Vol. I by Chapman, The English Language Book Society	
2)	Workshop Technology, Vol-I by H.S. Bawa, TMH Publications, New Delhi	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Communication Skills (25UGS11401)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	1	MSE:	25 Marks
Tutorials:	-	-	ICA:	-
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Use correct grammar, vocabulary, articles, and tenses in speaking and writing.			
CO 2	Explain the communication process, types, barriers of communication and ways to overcome them.			
CO 3	Apply interview skills, group discussion techniques, and teamwork for career success.			
CO 4	Show communication through effective listening, speaking, reading, and writing.			
CO 5	Developing professional business letters, resumes, and emails clearly and correctly.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Grammar and Vocabulary for Communication Articles, Parts of Speech, Tenses, Vocabulary- Prefix, Suffix, Antonyms, and Synonyms.			3
Unit 2	Fundamentals of Communication Definition, Meaning & Importance of Communication, Process of Communication, Types of Communication: Verbal, Non-verbal, Written, Visual, Barriers to Effective Communication & Ways to Overcome.			3
Unit 3	Professional Communication and Career Skills Interview Techniques: Preparation, FAQs, Do's and Don'ts, Group Discussions: Do's and Don'ts, Participation, Evaluation, Time Management, and Teamwork in Communication.			3
Unit 4	Oral Communication & Presentation Skills Effective Use of L, S, R, W, Listening Skills: Types and Barriers, Public Speaking.			2

Unit 5	Written Communication Skills \ Business Letters, Resume and Cover Letter Writing, Email Writing.	2
Text Books:		
1)	Technical Communication: Principles and Practice By Meenakshi Raman & Sangeeta Sharma Publisher: Oxford University Press	
2)	Communication Skills By Sanjay Kumar & Pushp Lata Publisher: Oxford University Press	
Reference Books:		
1)	Effective Technical Communication By M. Ashraf Rizvi	
2)	Developing Communication Skills By Krishna Mohan & Meera Banerji Publisher: Macmillan India	
3)	Business and Managerial Communication By Sailesh Sengupta Publisher: PHI Learning	
4)	Objective English By Hari Mohan Prasad & Uma Rani Sinha Publisher: McGraw Hill Education	
5)	English for Engineers and Technologists By Dr. Dhanavel S.P. Publisher: Orient BlackSwa	
6)	Business Communication By M.J. Mathew Publisher: RBSA Publishers	
7)	A Course in English Communication By Kiranmai Dutt, Geetha Rajeevan, C.L. Prakash Publisher: Foundation Books / Cambridge University Press India	

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	Communication Skills Lab (25UGS11402)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Explain common errors in English grammar and rectify them			
CO 2	Exhibit writing & speaking skills through controlled and guided activities			
CO 3	Describe effective presentations aided by ICT tools.			
CO 4	Provide communication skills that enhance their employability skills			
CO 5	Demonstrate interpersonal and soft skills to participate actively in interviews and group discussions.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Self Introduction & Role Plays.			2
Ex. 2	SWOT Analysis and Stress Management.			2
Ex. 3	PPT Presentation and Non- Verbal Communication.			2
Ex. 4	Group Discussion on Technical Topics.			2
Ex. 5	Debate Session.			2
Ex. 6	LSRW Activities: Storytelling & Listening Circles.			2
Ex. 7	Newspaper Reading & Vocabulary Building.			2
Ex. 8	News Presentation & Event Narration.			2
Ex. 9	Extempore Speaking.			2
Ex. 10	Mock Interview Practice.			2
Text Books:				

1)	Technical Communication: Principles and Practice By Meenakshi Raman & Sangeeta Sharma. Publisher: Oxford University Press.
2)	Communication Skills By Sanjay Kumar & Pushp Lata Publisher: Oxford University Press.
Reference Books:	
1)	Effective Technical Communication By M. Ashraf Rizvi.
2)	Developing Communication Skills By Krishna Mohan & Meera Banerji Publisher: Macmillan India.
3)	Business and Managerial Communication By Sailesh Sengupta, Publisher: PHI Learning.
4)	Objective English By Hari Mohan Prasad & Uma Rani Sinha, Publisher: McGraw-Hill Education.
5)	English for Engineers and Technologists By Dr. Dhanavel S.P. Publisher: Orient BlackSwan.
6)	Business Communication By M.J. Mathew Publisher: RBSA Publishers.
7)	A Course in English Communication By Kiranmai Dutt, Geetha Rajeevan, C.L. Prakash Publisher: Foundation Books / Cambridge University Press India.

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	First Year B. Tech.			
	Semester-I (w.e.f. A.Y. 2025-26)			
	NSS (25UGS11301)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	4	2	ESE:	-
Total:	4	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Explain the aims, objectives, and structure of NSS and its role in nation-building.			
CO 2	Demonstrate social awareness and the ability to identify community problems through participation in regular and special camping activities.			
CO 3	Apply the principles of volunteerism in organizing and participating in community service activities.			
CO 4	Use leadership qualities, teamwork, and communication skills through group activities and social work.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Introduction to NSS Historical background of NSS in India and its development, Aims and Objectives of NSS Organizational structures, roles & responsibilities. Emblem sign, NSS badge, Flag, Clap, NSS Songs: Lakshya Geet, Sadbhavana Geet, Rashtriya Yuva Geet.			12
Ex. 2	NSS Programmes and Activities and Role of Youth Concept of NSS activities, Regular activities, Special camp, Day Camps, Financial pattern of the scheme, Role of Youth, Understanding Youth, Understanding the community, Youth a subagents of social change, Issues, challenges, and opportunities for youth, Youth-adult partnership, Voluntarism need and importance.			14
Ex. 3	Activity Based Programmes Awareness Programmes: Seminars, workshops, celebration of National and International days, Personality Development programmes, group activities, etc., Yoga day celebration, Rally, Campus Cleaning, Tree plantation, Blood donation, Medical checkup, Health			14

	Awareness camp, etc.	
Ex. 4	NSS Programmes Implementation of Central, State Govt., and Local governing bodies and NGO Program Activities or Directed by the University, Yuva Portal, Voter awareness, Skill Development, Entrepreneurship and Rural development, Youth exchange program, Women Empowerment.	12
Text Books:		
1)	NSS and Youth Development" by Dr. Sunita Agarwalla.	
2)	Text Book of National Service Scheme (Volume –I).	
Reference Books:		
1)	National Service Scheme (NSS) (Mumbai University).	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Applied Chemistry (25UGS12005)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Describe water chemistry concepts and identify the water treatment process for engineering applications.			
CO 2	Explain fuels and lubricants and classify them based on their properties as suitable energy sources and engineering materials.			
CO 3	Discuss corrosion concepts and common methods for prevention.			
CO 4	Describe chemical analysis methods and perform solution preparation, titration, and analytical techniques.			
CO 5	Summarize knowledge of cement, polymers, and rubber for engineering use.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Water Treatment Introduction, Water Standards: Industrial and domestic water quality as per BIS guidelines. Water Hardness: Definition, units (ppm, mg/L), types – Temporary and Permanent hardness, Causes and Impacts – scaling in boilers and pipelines, desirable parameters for drinking water, domestic water, and industrial use, Water Softening Techniques: lime–soda process and Zeolite methods. Flow chart and function of water treatment process for drinking water: Aeration and Disinfection, Numerical problems based othe n hardness of water.			5
Unit 2	Fuels and Lubricants Fuels: Definition and classification – solid, liquid, gaseous fuels, Characteristics of an ideal fuel, Calorific value – Gross and Net calorific value, Coal analysis – Proximate analysis and significance in fuel grading, numericals.			6

	Lubricants: Introduction and Importance, types of lubricants, Physical and chemical properties – Viscosity, Surface tension, Flash point, Fire point, Acid value, and Saponification value.	
Unit 3	Corrosion and its prevention Definition, causes, and industrial significance, Types – Dry and Wet corrosion, Electrochemical theory of corrosion: Anodic and cathodic areas, electrode reactions, Prevention Methods: Cathodic protection – sacrificial anode, impressed current, Anodic protection, coatings, galvanizing, electroplating, Use of inhibitors and alloying	5
Unit 4	Introduction to Analytical Chemistry Chemical Analysis: Importance in engineering and science, Types: Qualitative and Quantitative analysis, Electroanalytical Methods: Introduction and need for electrochemical analysis, pH-metric and conductometric titration -Electrode systems and instrumentation basics. Construction & function of glass and conductivity electrodes.	5
Unit 5	Engineering Materials Introduction to engineering materials, Cement: Portland cement- composition, hydration Reaction, grades, setting Time, and uses, Gypsum & plaster of Paris: Properties and use in moulding and finishing, Natural rubber and styrene butadiene rubber: processing and engineering uses.	5
Text Books:		
1)	Jain P.C & Jain Monica, Engineering Chemistry, Dhanpat Rai & Sons, Delhi, 1992.	
2)	Bhal & Tuli, Text book of Physical Chemistry, S. Chand & Company, New Delhi.	
Reference Books:		
1)	Barrow G.M., Physical Chemistry, McGraw-Hill Publication, New Delhi.	
2)	O. G. Palanna, Engineering Chemistry, Tata McGraw-Hill Publication, New Delhi.	
3)	WILEY, Engineering Chemistry, Wiley India, New Delhi, 2014.	
4)	S. S. Dara, Engineering Chemistry, McGraw-Hill Publication, New Delhi.	
5)	Willard, Hobart H.; Merritt, Lynne L., Jr.; Dean, John A. Instrumental Methods of Analysis, American Chemical Society	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Applied Chemistry Lab (25UGS12006)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Determine water quality analysis and key parameters for environmental monitoring.			
CO 2	Calculate physical properties of lubricants to evaluate their suitability in engineering applications.			
CO 3	Examine oils and assess deterioration levels through chemical characterization tests.			
CO 4	Use electrochemical and instrumental methods to identify the equivalence point in titrations.			
CO 5	Apply analytical and thermal techniques to separate components and estimate the energy content of fuels.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Determination of Dissolved Oxygen in water by Iodometric method.			2
Ex. 2	Determination of water holding capacity of Soil.			2
Ex. 3	Determination of viscosity of lubricant oil using Ostwald's viscometer.			2
Ex. 4	Estimation of rate of corrosion of the given aluminum piece.			2
Ex. 5	Determination of surface tension of lubricants by the stalagmometer.			2
Ex. 6	Determination of the acid value of an oil.			2
Ex. 7	Determination of Calcium Oxide (CaO) Percentage in Cement Sample			2
Ex. 8	Determination of the equivalent point in acid-based titration using a pH meter.			2
Ex. 9	Separation and identification of cations by paper chromatography.			2
Ex. 10	Determination of equivalence point by Acid–Base Conductometric Titration.			2

<i>Text Books:</i>	
1)	Jain P.C & Jain Monica, Engineering Chemistry, DhanpatRai& Sons, Delhi, 1992.
2)	Bhal&Tuli, Textbook of Physical Chemistry, S. Chand & Company, New Delhi.
<i>Reference Books:</i>	
1)	Barrow G.M., Physical Chemistry, McGraw-Hill Publication, New Delhi.
2)	O. G. Palanna, Engineering Chemistry, Tata McGraw-Hill Publication, New Delhi.
3)	WILEY, Engineering Chemistry, Wiley India, New Delhi, 2014.
4)	S. S. Dara, Engineering Chemistry, McGraw-Hill Publication, New Delhi.
5)	Willard, Hobart H.; Merritt, Lynne L., Jr.; Dean, John A. Instrumental Methods of Analysis, American Chemical Society

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Engineering Mathematics-II (25UGS12007)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	1	1	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	4	4	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Use matrix algebra to solve systems of linear equations in engineering problems.			
CO 2	Apply matrix methods to find eigenvalues and eigenvectors, and use the Cayley-Hamilton theorem with applications.			
CO 3	Demonstrate curve tracing in various coordinate systems.			
CO 4	Apply multiple integrals to determine the area and mass of a lamina.			
CO 5	Apply statistical tools like correlation, regression, and curve fitting for effective engineering data analysis.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Matrices Rank of a matrix, normal form of a matrix, consistency of systems of linear equations, system of homogeneous equations and non – homogeneous equations, linear dependence and independence of vectors, applications to diverse engineering problems: Electrical and Electronics engineering applications, balancing the chemical reactions.			8
Unit 2	Eigen Values and Eigen Vectors Eigen values, eigen vectors, properties of eigen values and eigen vectors, Cayley-Hamilton Theorem (without Proof), applications of Cayley-Hamilton theorem, applications to various engineering problems: stability in control systems.			8
Unit 3	Tracing of Curves. Definition and significance of curve tracing, Classification of curves: Cartesian, polar, parametric, etc., tracing of Cartesian curves, tracing of parametric curves, tracing of polar curves: cardioid and rose curve only.			8

Unit 4	Multiple Integration Double integration, evaluation over the given region, change of order of integration, change to polar coordinates, triple integration, application of double integral to compute area, mass of lamina.	8
Unit 5	Statistics Correlation: Karl Pearson’s coefficient of correlation, regression, fitting of curve: fitting of straight line, parabola, and related curves, applications to various engineering problems.	7
Text Books:		
1)	Higher Engineering Mathematics (42nd Edition), B. S. Grewal, Khanna Publications, Delhi.	
2)	Advanced Engineering Mathematics, E. Kreyzig’s, John Wiley & Sons, INC.	
Reference Books:		
1)	Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi	
2)	A Text Book of Engineering Mathematics by Peter O’ Neil, Thomson Asia Pte Ltd., Singapore.	
3)	Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata McGraw- Hill Publishing Company Ltd., New Delhi.	
4)	Engineering Mathematics, Srimanta Pal and Subodh C. Bhunia, Oxford University Press India.	
5)	Mathematics for Engineering Applications, Kuldip S. Rattan and Naathan W. Klingbeil, Wiley. (Modeling and Core Engineering Application).	
6)	Engineering Mathematics Through Applications, Kuldeep Singh, PalgraveMacmilan.	
7)	Fundamentals of Statistics, S. C. Gupta, Himalaya House Publication.	
8)	Advanced Engineering Mathematics, H. K. Dass, S. Chand Publications, Delhi.	
9)	A Textbook of Applied Mathematics, P. N. and J. N. Wartikar, Vol.1, Pune VidyarthiGrihaPrakashan.	
10)	A Course in Engineering Mathematics (Vol I) by Dr. B. B. Singh, Synergy Knowledgeware, Mumbai.	
Sr. No.	Name of Tutorial / Assignment	
1)	Solve numericals on the rank of a matrix using the normal form.	
2)	Solve numericals on a system of simultaneous linear equations by the matrix method.	
3)	Solve numericals to find eigen values and eigen vectors of the matrix.	
4)	Solve numericals on the Cayley-Hamilton theorem.	
5)	Solve numericals on tracing of parametric curves.	
6)	Solve numericals on tracing of polar curves.	
7)	Solve numericals of changing the order of integration.	
8)	Solve numericals to find the area and mass of a lamina by using double integration.	
9)	Solve numericals on correlation and regression.	
10)	Solve numericals on the fitting of curves.	

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	First Year B.Tech.			
	Semester-II (w.e.f.A.Y.2025-26)			
	Applied Mechanics(25UCE12003)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO1	Determine the resultant force and moment for the given force system.			
CO2	Examine the forces in static structures through free body diagrams, equilibrium equations for beams, and framed systems.			
CO3	Calculate frictional forces, centroids, and the center of gravity for simple and composite bodies using fundamental engineering principles.			
CO4	Solve problems related to linear and projectile motion using principles of kinematics and laws of motion.			
CO5	Apply the concepts of kinetics, work–energy and impulse–momentum methods to a particle in motion.			
Unit	Course Contents			No. of lectures (hrs.)
Unit1	Introduction to Engineering Mechanics Basic Concepts- Classification of Mechanics, Laws of Mechanics, Systems of Forces: Coplanar Concurrent Forces & Non-concurrent Forces Resultant of Force System, Varignon's Theorem, Laws of Forces & Resultant of Force Systems. Moment of Force and its Application – Couples.			7
Unit2	Equilibrium of Systems of Forces Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces, Lami's Theorem, and Condition of Equilibrium. Types of Loads, Supports & Beams; Analysis of Beam & Framed Structures			7
Unit3	Friction, Centroid & Moment of Inertia Friction: Introduction, limiting friction, and impending motion. Coulomb's laws of dry friction, coefficient of friction, and cone of friction. Centroid- Centroid of simple			8

	figures (from basic principles) – Centroid of composite figures. Centre of Gravity: Centre of gravity of a simple body (from basic principles).	
Unit4	Kinematics of Particle Kinematics of linear motion: types of motion, laws of motion, Kinematics of particles, rectilinear motion, constant and variable acceleration, study of motion diagrams, Motion under gravity, projectile motion, concept of relative velocity.	7
Unit5	Kinetics and Work, Power, Energy Kinetics of particle: D ‘Alembert’s principle: applications in linear motion, kinetics of rigid bodies, Applications in translation. Work done by a force, potential energy, kinetic energy of linear motion and rotation, work-energy equation, conservation of energy, and power. Collision of elastic bodies, Impulse momentum principle.	7
Text Books:		
1)	Engineering Mechanics statics and dynamics-A. K. Tayal, Umesh Publications.	
2)	Engineering Mechanics statics and dynamics-A Nelson, McGraw Hill publications.	
3)	Engineering Mechanics By, Tayal A. K. Umesh Publications, 2010	
Reference Books:		
1)	Engineering Mechanics, By Bhavikatti S. S., Rajashekarappa K.G.; New Age International Publications, 2nd Edition	
2)	Applied Mechanics, By-Junnarkar S.B., and Shah, H. J.; Charotar Publication House Anand.	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Applied Mechanics Lab (25UCE12004)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO1	Calculate the resultant force for the given force system.			
CO2	Determine the centroid or moment of inertia of the given structural elements of a specific shape and size.			
CO3	Calculate force & moment to solve the given force system.			
CO4	Determine unknown forces or moments using the equilibrium condition			
CO5	Apply the laws of friction in the given situation.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
1	Verify the law of polygon of forces using the Universal force table for given forces.			2
2	Determine the Resultant of concurrent coplanar forces using the graphical method.			2
3	Verify the centroid of a plane figure of given dimensions by making a simple paper model.			2
4	Determine the Moment of Inertia of a Fly Wheel			2
5	Determine the support reactions of a simply supported beam using the parallel force or beam reaction apparatus for given vertical forces.			2
6	Determine the support reactions of a simply supported beam using the graphical method			2
7	Verify the law of moment of forces using the law of moment apparatus for the given forces. (by Bell Crank Lever)			2
8	Verify Lami's theorem using the Universal force table apparatus for the given forces.			2

9	Determine the coefficient of friction using the friction apparatus for the given block on the inclined plane.	2
<i>Text Books:</i>		
1)	Engineering Mechanics statics and dynamics-A. K. Tayal, Umesh Publications.	
2)	Engineering Mechanics statics and dynamics-A Nelson, McGraw Hill publications.	
3)	Engineering Mechanics By, Tayal A. K. Umesh Publications, 2010	
<i>Reference Books:</i>		
1)	Engineering Mechanics, By Bhavikatti S. S., Rajashekarappa K.G.; New Age International Publications, 2nd Edition	
2)	Applied Mechanics, By-Junnarkar S.B., and Shah, H. J.; Charotar Publication House Anand.	



**FABTECH EDUCATION SOCIETY'S
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(An Autonomous Institute)**

First Year B. Tech.

Semester-II (w.e.f. A.Y. 2025-26)

Basic Mechanical Engineering (25UME12005)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

CO 1	Explain the basic domains of mechanical engineering and the working of simple machine tools	
CO 2	Describe power plants and IC engines with their basic components and working..	
CO 3	Apply basic design, aesthetics, and ergonomic principles to simple products	
CO 4	Explain basic thermodynamic concepts and laws.	
CO 5	Demonstrate working principles of pumps, compressors, and turbines.	

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction to Mechanical Engineering Role of Mechanical Engineering in Industries and Society, sub-domains of mechanical engineering: Thermodynamics, fluid mechanics, manufacturing engineering, robotics and automation, aerospace engineering, automotive engineering, mechatronics, Machine tools: Centre Lathe - Basic elements, working, Operations on lathe - Turning, Facing. Drilling Machine - Basic elements of the drilling machine, applications.	5
Unit 2	Power Plants and IC engines. Power Plants: Thermal Power Plant, Hydroelectric Power Plant, Nuclear Power Plant, Elements, Advantages, Limitations, IC engines- definition, classification, components of IC engines, 2-Stroke and 4-Stroke engines.	5
Unit 3	Engineering Design, Aesthetic & Ergonomics Engineering Design: Need of Design, Design considerations, steps in design,	5

	Aesthetics: Definition, Importance of Aesthetics in design, Principles of Aesthetics, Ergonomics: Definition, Importance of Ergonomics in design, ergonomic principles, and fundamentals of Man-Machines system.	
Unit 4	Fundamentals of Thermodynamics Fundamentals of Thermodynamics: Concept of system, boundary, and surroundings, types of system, process & Cycles, Properties- Intensive and extensive, Thermodynamic equilibrium, Zeroth law of thermodynamics, laws of thermodynamics.	5
Unit 5	Pumps, compressor and Turbines: Pumps: Definition, Classification, and working principles of Pumps (centrifugal and reciprocating), Compressor: Construction, working, and application of reciprocating compressor, rotary compressor, Turbines: Construction, working, and application of Pelton wheel, Francis Turbine, Kaplan Turbine.	6
Text Books:		
1)	Fundamentals of Mechanical Engineering by Sawhney G.S. &Jaspal Singh, PHI Learning Pvt. Ltd.	
2)	Introduction to Mechanical Engineering by Michael Clifford, Kathy Simmons, Philip Shipway, CRC Press / Taylor & Francis.	
Reference Books:		
1)	Basic Mechanical Engineering by R. K. Rajput, Laxmi Publications.	
2)	Elements of Mechanical Engineering by S. Trymbaka, Murth University Press.	
3)	Basic Mechanical Engineering by D.S. Kumar, S.K. Kataria & Sons.	
4)	Basic Mechanical Engineering by Basant Agarwal, Wiley Precise.	
5)	Basic Mechanical Engineering by Pravin Kumar, Pearson Publications.	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Basic Mechanical Engineering Lab (25UME12006)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	
Tutorials:	-	-	ICA:	25 Marks
Practical:	02	01	ESE:	
Total:	02	01	OE/POE:	25 Marks
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Explain the construction and working of basic workshop machines, such as the center lathe and drilling machine			
CO 2	Demonstrate the working principles and operating cycles of 2-stroke and 4-stroke IC engines using models.			
CO 3	Illustrate the layout and functioning of a hydroelectric power plant and its major components.			
CO 4	Demonstrate the construction, working, and applications of centrifugal pumps and Pelton wheel turbines.			
CO 5	Use domestic products based on aesthetics and ergonomic considerations, and relate observations from industrial visits to real engineering practice.			
Ex.	Experiment Details(Any 07 practical/experiments will be completed)			No. of Ex. Sessions (hrs.)
Ex. 1	Study and Demonstration of Centre Lathe – Operations such as Turning, Facing.			2
Ex. 2	Study and Demonstration of Drilling Machine – Basic drilling operations.			2
Ex. 3	Study and Demonstration of 2-Stroke and 4-Stroke IC Engines.			2
Ex. 4	Study of Hydroelectric Power Plant Layout.			2
Ex. 5	Study of Aesthetics and Ergonomic Considerations for Domestic Products.			2
Ex.6	Study and Demonstration of Centrifugal Pump.			2
Ex. 7	Study and Demonstration of Pelton Wheel Turbine.			2
Ex. 8	Industrial Visit – Power plant / Pump house			2
Text Books:				
1)	Fundamentals of Mechanical Engineering by Sawhney G.S. &Jaspal Singh, PHI Learning Pvt. Ltd.			

2)	Introduction to Mechanical Engineering by Michael Clifford, Kathy Simmons, Philip Shipway, CRC Press / Taylor & Francis
Reference Books:	
1)	Basic Mechanical Engineering by R. K. Rajput, Laxmi Publications
2)	Elements of Mechanical Engineering by S. Trymbaka Murth Universities Press
3)	Basic Mechanical Engineering by D.S. Kumar, S.K. Kataria & Sons
4)	Basic Mechanical Engineering by R. K. Rajput, Laxmi Publications

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Programming Techniques and Applications (25UME11129)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	1	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Understand the fundamental concepts of the C language to construct basic programs.			
CO 2	Apply control structures such as conditional statements and loops to develop logic-driven problems.			
CO 3	Demonstrate effective use of arrays, strings, and pointers, including dynamic memory allocation to solve data processing tasks.			
CO 4	Analyze and implement problem-solving strategies and algorithm design techniques.			
CO 5	Design and develop applications using C language for real-world problems.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Process of Programming History of C, Importance of C, Algorithms vs Flowcharts vs Pseudocode, Top-down vs Bottom-up design.			2
Unit 2	Basics of C Programming Structure of a C Program, Data Types and Variables, Constants, Identifiers, Operators and Expressions, Input and Output Functions.			3
Unit 3	Control Structures Conditional Statements, if, if-else, nested if, switch-case, Loops and Iteration-for, while, do-while loops, Nested loops, Break, continue, goto statements.			3

Unit 4	Arrays and Strings One-dimensional and Two-dimensional Arrays, Array Initialization and Memory Representation, String Handling: Input/output, string functions (strlen, strcpy, strcmp, etc.), Applications of Arrays and Strings in Problem Solving.	4
Unit 5	Introduction to Problem Solving Definition of a problem and solution, Steps in problem solving, Problem solving strategies (Trial and Error, Divide and Conquer, Greedy Approach, etc.).	3
Text Books:		
1)	Computer Fundamentals and Programming in C" by E. Balagurusamy	
2)	Programming and Problem Solving with C" by Ashok N. Kamthane and Amit Kamthane	
Reference Books:		
1)	Let Us C by Yashavant Kanetkar	
2)	Programming in ANSI C by E. Balagurusamy	
3)	How to Solve It by Computer by R.G. Dromey	
4)	The C Programming Language by Brian W. Kernighan and Dennis M. Ritchie	
5)	Computer Programming and Problem Solving by A.N. Kamthane and Amit Ashok Kamthane	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Programming Techniques and Applications Lab (25UME11130)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	50 Marks
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Apply control structures and data types in C programming.			
CO 2	Solve problems using algorithms and data structures.			
CO 3	Demonstrate use of arrays, strings, and dynamic memory allocation to solve data processing tasks.			
CO 4	Use C programming concepts to solve real-world problems and applications.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Write an algorithm for the area of a rectangle and the area of a circle.			2
Ex. 2	Write a program in C that calculates the sum of the first N natural numbers (1, 2, 3, ..., N), where N is a positive integer entered by the user.			2
Ex. 3	Write a program in C that checks whether a given integer is even or odd using an if-else control structure.			2
Ex. 4	Write a program in C that checks if a given string is a palindrome .			2
Ex. 5	Write a program in C that reverses a given integer using a while loop.			2
Ex. 6	Write a program in C that reverses the elements of a given array.			2
Ex. 7	Write a program in C that calculates the length of a string without using the strlen() function by iterating through the string.			2
Ex. 8	Write a C program to implement Binary Search using the divide and conquer technique.			2

Ex. 9	Write a C program to sort an array using the Merge Sort algorithm (Divide and Conquer).	2
Ex. 10	Write a program for 5 students having data members roll no, name.	2
Text Books:		
1)	Computer Fundamentals and Programming in C" by E. Balagurusamy.	
2)	Programming and Problem Solving with C" by Ashok N. Kamthane and AmitKamthane.	
Reference Books:		
1)	Let Us C by Yashavant Kanetkar.	
2)	Programming in ANSI C by E. Balagurusamy.	
3)	How to Solve It by Computer by R.G. Dromey.	
4)	The C Programming Language by Brian W. Kernighan and Dennis M. Ritchie.	
5)	Computer Programming and Problem Solving by A.N. Kamthane and Amit Ashok Kamthane.	

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	(An Autonomous Institute)			
	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Computer Tools & Applications Lab (25UGS11102)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:			ICA:	50 Marks
Practical:	4	2	ESE:	-
Total:	4	2	OE/POE:	
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Demonstrate a clear understanding of basic computer concepts and effectively operate operating system environments (Windows/Linux) for daily office tasks.			
CO 2	Illustrate word format, and manage professional documents using word processing tools like MS Word or Google Docs, including mail merge and print setup.			
CO 3	Use spreadsheet software to organize, analyze, and present data using formulas, functions, charts, and formatting techniques.			
CO 4	Design engaging presentations and communicate effectively using email, internet tools, and virtual meeting platforms.			
CO 5	Operate common office equipment, manage digital files securely, use cloud storage, and apply basic cybersecurity practices to protect data.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Create a formatted document with headings, bullet lists, page setup, header/footer, and page numbers.			2
Ex. 2	Perform a Mail Merge to generate multiple invitation letters or certificates using a contact list.			2
Ex. 3	Insert tables, images, symbols, and use spelling/grammar tools in a professional document.			2
Ex. 4	Enter data in a spreadsheet and apply basic formatting and functions like SUM, AVERAGE, and IF.			2

Ex. 5	Create charts (bar, pie, line) from data and apply sorting, filtering, and conditional formatting.	2
Ex. 6	Demonstrate use of cell referencing (relative/absolute), data validation, and password protection in sheets.	2
Ex. 7	Design a PowerPoint presentation with text, images, transitions, animations, and audio/video using the Canva tool.	2
Ex. 8	Use Gmail to compose and send an email with CC/BCC, attach files, and organize emails into folders/labels.	2
Ex. 9	Demonstrate use of cloud storage (Google Drive/One Drive) – upload, organize, share, and download files.	2
Ex. 10	Practice basic cybersecurity: set strong passwords, identify phishing emails, and explore antivirus/firewall tools.	2
Ex. 11	Create a virtual meeting for effective communication using Zoom or Google Meet platform.	2
Ex.12	Case Study: How to use AI tools and common software like Word, Excel, PowerPoint, Gmail, and cloud storage to create documents, manage data, design presentations, send emails, and ensure cybersecurity.	2

Note:

1. For the 12th practical, assign a list of case studies based on all 11 previous practicals. Each group of 4 students should select one case study, create a detailed report in a Word file, upload the file to Google Drive, and share the link via email.

Text Books:

1)	A Textbook of Computer Applications" by P. K. Sinha & Priti Sinha
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Text Books:

1)	"Fundamentals of Computers" by V. Rajaraman
2)	"Computer Applications" by Niranjana Shrivastava
3)	Computer Applications in Business" by R. Parameswaran

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	IKS-Vedic Mathematics (25UGS11201)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	2	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Explain the concept of IKS and the overview of Vedic mathematics.			
CO 2	Solve problems on vinculum numbers, beejank methods, and straight division using Paravartya and Dhvajank.			
CO 3	Demonstrate Dwandvayoga, Vilokanam, and traditional methods for square roots, cube roots, and extended operations.			
CO 4	Predict recurring decimal patterns and verify divisibility using osculators like Ekadhikena and Ekanyunena.			
CO 5	Determine the advantages of simultaneous operations in mixed arithmetic calculations.			
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Indian Knowledge System and Vedic Mathematics IKS Foundational concepts and characteristics of Indian philosophical and scientific traditions; Significance of Ancient Knowledge, Overview of Indian mathematics, works by Indian Mathematicians, Vedic Mathematics, aims and objectives of vedic mathematics, Sutras and Up-sutras of Vedic Mathematics.			5
Unit 2	Fundamental Operations in Arithmetic Vinculum Numbers and their Applications in Tables, Addition, Multiplication and Division, Multiplication, by Nikhilam, Ekadhikena, Ekanyunena&Urdhvatiryagbhyam, Beejank and their Applications in Addition, Subtraction, Multiplication, Square and Division, Straight Division by Nikhilam, Paravartya&Dhvajank.			6
Unit 3	Extended Operations Square and Square root by Dwandvayoga, Addition and Difference of Square, Square root			5

	by Vilokanam&Dwandva yoga, Cube and Cube root, MeruPrastar in Higher Powers.	
Unit 4	Osculators Recurring Decimals by Ekadhikena and Ekanyunena, Divisibility Test and Quotient by Ekadhikena and Ekanyunena.	5
Unit 5	Mixed Operations Mixed Operations of Addition, Subtraction Multiplication and Square by Simultaneous Operations.	5
Text Books:		
1)	Introduction to Indian Knowledge System: Concepts and Applications, Mahadevan B., BhatVinayakRajat, NagendraPavana R.N. (2022), PHI Learning Private Ltd. Delhi.	
2)	Vedic Mathematics, S.B. K. Tirthaji, Agrawala (editor), Motilal Banarsidas, New Delhi	
Reference Books:		
1)	Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sansthan Kurushetra	
2)	Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi	
3)	Lilavati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition	
4)	History of Science in India Volume-1, Part-I, Part-II, Volume VIII, SibajiRaha, et al. National Academy of Sciences, India and The Ramkrishan Mission Institute of Culture, Kolkata (2014).	
5)	Indian Knowledge Systems Vol – I & II, Kapoor Kapil, Singh Avadhesh (2021), Indian Institute of Advanced Study, Shimla, H. P..	
6)	Mathematics in Ancient and Medieval India, Bag, A. K. (1979). Chaukhamba Orientalia, New Delhi.	
7)	Textbook on The Knowledge System of Bhārata, Bhag Chand Chauhan, Garuda Prakashan.	

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	First Year B. Tech.			
	Semester-II (w.e.f. A.Y. 2025-26)			
	Yoga/Sports (25UGS11302)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	4	2	ESE:	-
Total:	4	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				
CO 1	Demonstrate the forms of yoga.			
CO 2	Demonstrate the practices of pranayama.			
CO 3	Apply the fundamental ideas and methods of physical education.			
CO 4	Apply knowledge of sports for physical and mental wellness.			
CO 5	Illustrate the use of yoga, pranayama, and sports activities to promote physical fitness and mental well-being.			
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Yoga History and philosophy of yoga, different styles of yoga (Hatha, Vinyasa, Ashtanga, Basic yoga postures (asanas) and their benefits, Principles of alignment and balance, Shitalikarna, Vyayama, Suryanamaskara.			12
Ex. 2	Pranayama and Breath Control Pranayama, importance of pranayama, types of pranayama (e.g., AnulomVilom, Kapalabhati, Bhramari), Benefits of breath control for physical and mental health.			12
Ex. 3	Physical Education Meaning, Definition and Importance of Physical Education, Aim and Objective, Conditioning exercises, warming up and cooling down.			8
Ex. 4	Fundamentals of Sports for Wellness Types of sports and their health benefits, Indoor and outdoor sports. Basic principles of physical fitness and conditioning, developing a personalized fitness plan, safety measures,			12

	and injury prevention.	
Ex. 5	Sports, Yoga, and Pranayama Synergistic benefits of combining sports, yoga, and pranayama, pranayama to enhance sports performance and recovery.	12
Text Books:		
1)	Fundamentals of Track and Field, P. N. Dharma, KhelSahitya Kendra, New Delhi.	
2)	Asanas- Swami Kuvalayananda Pioneer in Scientific Yoga, Swami Kuvalayananda, Kaivalyadhama SamitiLonavla.	
Reference Books:		
1)	History of Indian Theatre, ManoharLaxmanVaradpande (1987).	
2)	Indian Music (The Magic of the Raga), Raghava R. Menon	
3)	Modern Music: A Concise History (World of Art S.).	
4)	Modern Trends and Physical Education, A. Singh.	
5)	OP: Asana Why and How, Tiwari.	
6)	Light on Yoga, B. K. S. Iyengar.	
7)	Indian Art and Culture, NitinSinghania, McGraw Hill Edge	